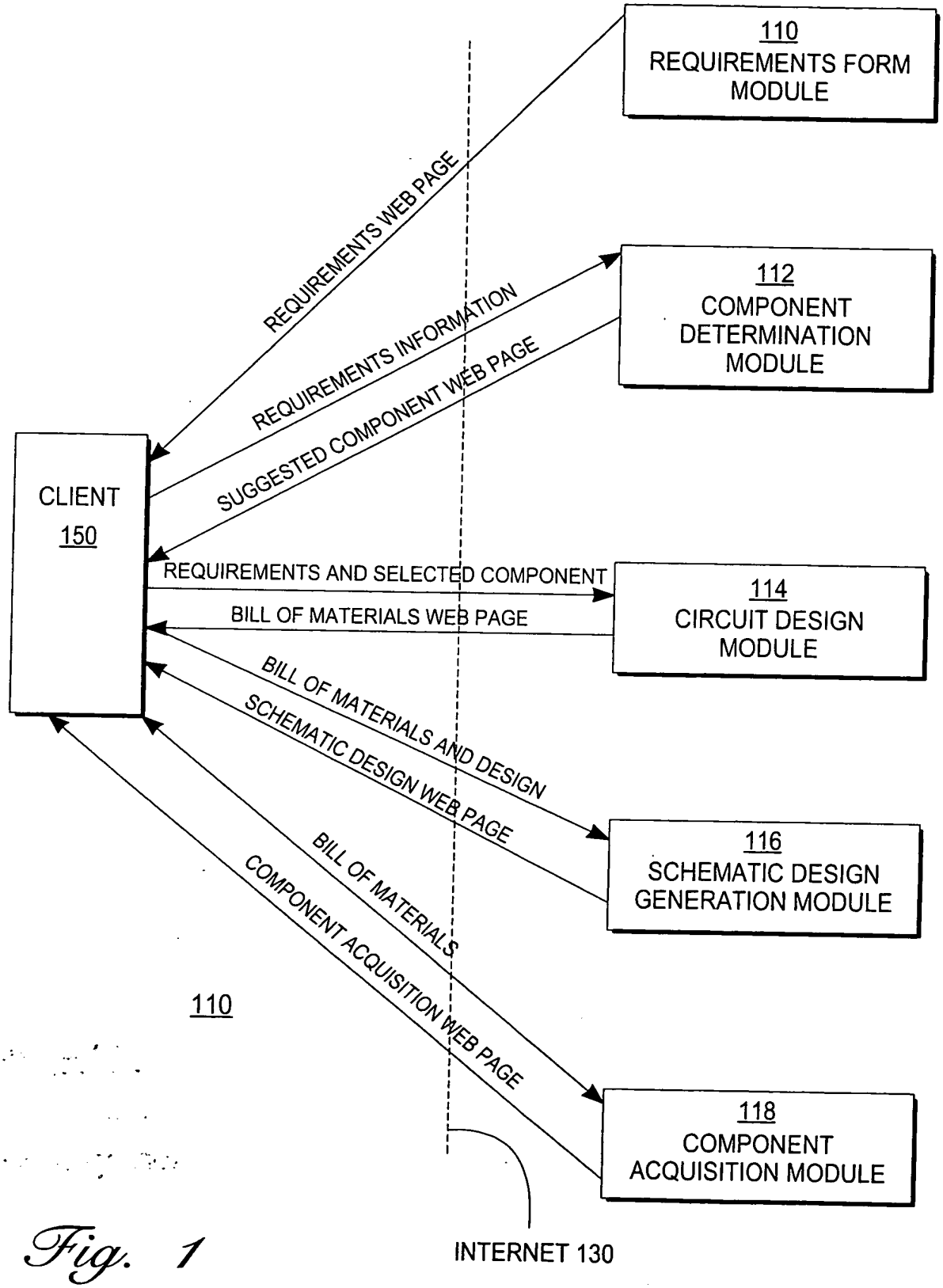
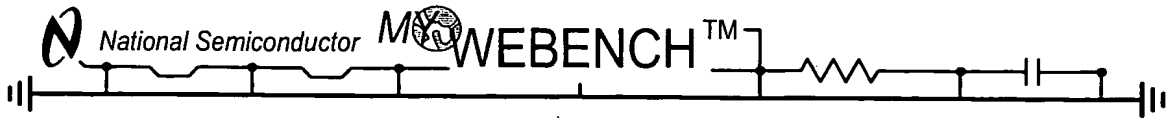


Fig. 1



My Webench

My Webench organizes your designs with secure password protected storage. Design details include your specifications, bill of material, schematic,simulations and on line ordering of parts and demo boards.

You currently have no stored designs.

Select one of the Design Assistants to start a New Design.

Webench Tools

Assistants Save Your Time!

Let our Design Assistants guide you through each step. You can choose from either the

- Power Supply Design Assistant

204

or

- Wireless EasyPLLDesign Assistant.

206

The assistant will walk you through each of the steps. You can choose when to stop as you can always return later to finish another step.

Visit these portals having Webench tools;

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- WIRELESS.NATIONAL.COM featuring EasyPLL

Using Webench Tools

Four Easy Steps and You're Done!

1 Choose a Part

Input your system specifications and you will find those devices that fit.

2 Create a Design

A design will be created for you including any necessary passive components and important calculated operating values.

3 Analyze a Design

Use a variety of simulation tests to validate your design.

4 Build It!

Buy a part, kit of parts, evaluation board.

202

Fig. 2

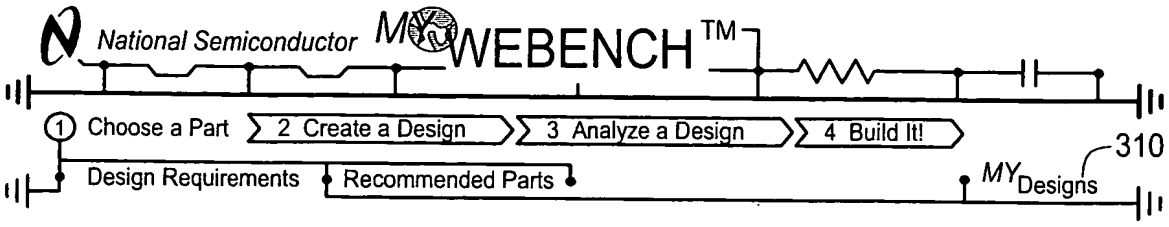

Fig. 3

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National Semiconductor MY WEBENCH™

1 Choose a Part > 2 Create a Design > 3 Analyze a Design > 4 Build It!

Design Requirements | Recommended Parts | MY Designs

Your Design Specifications

VinMin:14.0V VinMax:22.0V	Output #1 Vout= 3.3V Iout= 1.0A

Suggested Switching Regulators - Buck Topology

402 404

Product Folder	Webench Tools	Max Curr.	Typ. Eff.	On/ Off	Err. Pin	Other Features	Freq. kHz	Est. Price
LM2575-3.3	Create Design See CC Note below	1.0A	75%	Y	N		52	$1.72
LM2575-ADJ	Create Design See CC Note below	1.0A	75%	Y	N	Adj. Vout	52	$2.15
LM2575HV-3.3	Create Design See CC Note below	1.0A	75%	Y	N		52	$2.15
LM2575HV-ADJ	Create Design See CC Note below	1.0A	75%	Y	N	Adj. Vout	52	$2.15
LM2576-3.3	Create Design See CC Note below	3.0A	75%	Y	N		52	$2.40
LM2576-ADJ	Create Design See CC Note below	3.0A	75%	Y	N	Adj. Vout	52	$2.40
LM2576HV-3.3	Create Design See CC Note below	3.0A	75%	Y	N		52	$2.98
LM2576HV-ADJ	Create Design See CC Note below	3.0A	75%	Y	N	Adj. Vout	52	$2.98
LM2595-3.3	Create Design	1.0A	78%	Y	N		150	$1.86
LM2595-ADJ	Create Design	1.0A	78%	Y	N	Adj. Vout	150	$1.86
LM2596-3.3	Create Design	3.0A	73%	Y	N		150	$2.61
LM2596-ADJ	Create Design	3.0A	73%	Y	N	Adj. Vout	150	$2.61
LM2598-3.3	Create Design	1.0A	78%	Y	Y	SoftStart	150	$2.18
LM2598-ADJ	Create Design	1.0A	78%	Y	Y	SoftStart, Adj. Vout	150	$2.18
LM2599-3.3	Create Design	3.0A	73%	Y	Y	SoftStart	150	$2.91
LM2599-ADJ	Create Design	3.0A	73%	Y	Y	SoftStart, Adj. Vout	150	$2.91
LM2630	Create Design SeeCC Note below	8.0A	94%	Y	Y	Sync, SoftStart, Adj. Peak Current Limit	200	$2.75
LM2631	Create Design SeeCC Note below	8.0A	94%	Y	Y	Sync, SoftStart, Adj. Peak Current Limit	200	$2.75
LM2670-3.3	Create Design See CC Note below	3.0A	86%	Y	N	Sync, SoftStart	260	$2.63

Fig. 4

National Semiconductor

Design Purchasing Quality Company Jobs

Products > Analog - Regulators > Simple Switchers > LM2575

Product Folder

LM 2575 SIMPLE SWITCHER 1A Step-Down Voltage Regulator

See Also: LM2595 - low cost & more efficient
502 { LM2598 - upgrade
LM2672 - upgrade
LM2675 - upgrade

Generic P/N 2575

Contents

504

Parametric Table	
Multiple Output Capability	No
On/Off Pin	Yes
Error Flag	No
Input Voltage, min (Volt)	4
Input Voltage, max (Volt)	40
Output Current, max	1 Amp
Output Voltage (Volt)	12,15,3.30,5,1.20
Adjustable Output Voltage	No,Yes
Switching Frequency (Hz)	52000
Adjustable Switching Frequency	No
Sync Pin	No
Efficiency (%)	88,75,77
Inverting	Yes
Step-down	Yes

Fig. 5A

General Description

The LM2575 series of regulators are monolithic integrated circuits that provide all the active functions for a step-down (buck) switching regulator, capable of driving a 1A load with excellent line and load regulation. These devices are available in fixed output voltages of 3.3V, 5V, 12V, 15V, and an adjustable output version.

Requiring a minimum number of external components, these regulators are simple to use and include internal frequency compensation and a fixed-frequency oscillator.

The LM2575 series offers a high-efficiency replacement for popular three-terminal linear regulators. It substantially reduces the size of the heat sink, and in many cases no heat sink is required.

A standard series of inductors optimized for use with the LM2575 are available from several different manufacturers. This feature greatly simplifies the design of switch - mode power supplies.

Other features include a guaranteed ±4% tolerance on output voltage within specified input voltages and output load conditions, and ±10% on the oscillator frequency. External shutdown is included, featuring 50μA (typical) standby current. The output switch includes cycle-by-cycle current limiting, as well as thermal shutdown for full protection under fault conditions.

Fig. 5B

Features

- 3.3V, 5V, 12V, 15V, and adjustable output versions
- Adjustable version output voltage range, 1.23V to 37V (57V for HV version) ±4% max over line and load conditions
- Guaranteed 1A output current
- Wide input voltage range, 40V up to 60V for HV version
- Requires only 4 external components
- 52 kHz fixed frequency internal oscillator
- TTL shutdown capability, low power standby mode
- High efficiency
- Uses readily available standard inductors
- Thermal shutdown and current limit protection
- P^+ Product Enhancement tested

Applications

- Simple high-efficiency step-down (buck) regulator
- Efficient pre-regualtor for linear regulators
- On-card switching regulators
- Positive to negative converter (Buck-Boost)

Datasheet

Title	Size (in Kbytes)	Date	View Online	Download	Receive via Email
LM1575/LM2575/LM2575HV Series SIMPLE SWITCHER 1A Step-Down Voltage Regulator	609 Kbytes	1-Jun - 99	View Online	Download	Receive via Email
LM1575/LM2575/LM2575HV Series SIMPLE SWITCHER 1A Step-Down Voltage Regulator (JAPANESE)	894 Kbytes				

Fig. 56

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Package Availability, Models, Samples & Pricing

Part Number	Package		Status	Models		Samples & Electronic Orders	Budgetary Pricing		Std Pack Size	Package Marking
	Type	# pins		SPICE	IBIS		Quantity	$US each		
LM2575M-12	SOIC WIDE	24	Full production	N/A	N/A	Samples	1K+	$1.7200	tube of 30	[logo]¢U¢Z¢2¢T LM2575M -12 P+
LM2575M-15	SOIC WIDE	24	Full production	N/A	N/A	Samples	1K+	$1.7200	tube of 30	[logo]¢U¢Z¢2¢T LM2575M -15 P+
LM2575M-3.3	SOIC WIDE	24	Full production	N/A	N/A	Samples Order Parts	1K+	$1.7200	tube of 30	[logo]¢U¢Z¢2¢T LM2575M -3.3 P+
LM2575M-5.0	SOIC WIDE	24	Full production	N/A	N/A	Samples Order Parts	1K+	$1.7200	tube of 30	[logo]¢U¢Z¢2¢T LM2575M -5.0 P+
LM2575M-ADJ	SOIC WIDE	24	Full production	N/A	N/A	Samples Order Parts	1K+	$1.7200	tube of 30	[logo]¢U¢Z¢2¢T LM2575M -ADJ P+
LM2575MX-12	SOIC WIDE	24	Full production	N/A	N/A	• Order Parts	1K+	$1.7500	reel of 1000	[logo]¢U¢Z¢2¢T LM2575M -12 P+
LM2575MX-15	SOIC WIDE	24	Full production	N/A	N/A	•	1K+	$1.7500	reel of 1000	[logo]¢U¢Z¢2¢T LM2575M -15 P+
LM2575MX-3.3	SOIC WIDE	24	Full production	N/A	N/A	•	1K+	$1.7500	reel of 1000	[logo]¢U¢Z¢2¢T LM2575M -3.3 P+
LM2575MX-5.0	SOIC WIDE	24	Full production	N/A	N/A	• Order Parts	1K+	$1.7500	reel of 1000	[logo]¢U¢Z¢2¢T LM2575M -5.0 P+
LM2575MX-ADJ	SOIC WIDE	24	Full production	N/A	N/A	• Order Parts	1K+	$1.7500	reel of 1000	[logo]¢U¢Z¢2¢T LM2575M -ADJ P+
LM 2575N-12	MDIP	16	Full production	N/A	N/A	Samples	1K+	$1.7200	tube of	[logo]¢U¢Z¢3¢T¢P LM2575N

Fig. 5D

LM2575N - 12	MDIP	16	Full production	N/A	N/A	Samples Order Parts	1K+	$1.7200	tube of 20	[logo]¢U¢Z¢3¢T¢P LM2575N -12 P+
LM2575N - 15	MDIP	16	Full production	N/A	N/A	Samples Order Parts	1K+	$1.7200	tube of 20	[logo]¢U¢Z¢3¢T¢P LM2575N -15 P+
LM2575N - 5.0	MDIP	16	Full production	N/A	N/A	Samples Order Parts	1K+	$1.7200	tube of 20	[logo]¢U¢Z¢3¢T¢P LM2575N -5.0 P+
LM2575N - ADJ	MDIP	16	Full production	N/A	N/A	Samples Order Parts	1K+	$1.7200	tube of 20	[logo]¢U¢Z¢3¢T¢P LM2575N -ADJ P+
LM2575T - 12	TO - 220	5	Full production	N/A	N/A	Samples Order Parts	1K+	$1.4300	tube of 45	[logo]¢U¢Z¢2¢T LM2575T -12 P+
LM2575T - 15	TO - 220	5	Full production	N/A	N/A	Samples Order Parts	1K+	$1.4300	tube of 45	[logo]¢U¢Z¢2¢T LM2575T -15 P+
LM2575T - 3.3	TO - 220	5	Full production	N/A	N/A	Samples Order Parts	1K+	$1.4300	tube of 45	[logo]¢U¢Z¢2¢T LM2575T -3.3 P+
LM2575T - 5.0	TO - 220	5	Full production	N/A	N/A	Samples Order Parts	1K+	$1.4300	tube of 45	[logo]¢U¢Z¢2¢T LM2575T -5.0 P+
LM2575T - ADJ	TO - 220	5	Full production	N/A	N/A	Samples Order Parts	1K+	$1.4300	tube of 45	[lo go]¢U¢Z¢2¢T LM2575T -ADJ P+
LM2575S- 12	TO 263	5	Full production	N/A	N/A	Samples Order Parts	1K+	$1.4300	tube of 45	[logo]¢U¢Z¢2¢T LM2575S -12 P+
LM2575S- 15	TO 263	5	Full production	N/A	N/A	Order Parts	1K+	$1.4300	tube of 45	[logo]¢U¢Z¢2¢T LM2575S -15 P+
LM2575S- 3.3	TO 263	5	Full production	N/A	N/A	Samples Order Parts	1K+	$1.4300	tube of 45	[logo]¢U¢Z¢2¢T LM2575S -3.3 P+
LM2575S-	TO	5	Full	N/A	N/A	Samples	1K+	$1.4300	tube	[logo]¢U¢Z¢2¢T

Fig. 5E

LM2575S-ADJ	TO 263	5	Full production	N/A	N/A	Samples Order Parts	1K+	$1.4300	tube of 45	[logo]¢U¢Z¢2¢T LM2575S -ADJ P+
LM2575SX-12	TO 263	5	Full production	N/A	N/A		1K+	$1.4800	reel of 500	[logo]¢U¢Z¢2¢T LM2575S -12 P+
LM2575SX-15	TO 263	5	Full production	N/A	N/A		1K+	$1.4800	reel of 500	[logo]¢U¢Z¢2¢T LM2575S -15 P+
LM2575SX-3.3	TO 263	5	Full production	N/A	N/A	Order Parts	1K+	$1.4800	reel of 500	[logo]¢U¢Z¢2¢T LM2575S -3.3 P+
LM2575SX-5.0	TO 263	5	Full production	N/A	N/A	Order Parts	1K+	$1.4800	reel of 500	[logo]¢U¢Z¢2¢T LM2575S -5.0 P+
LM2575SX-ADJ	TO 263	5	Full production	N/A	N/A	Order Parts	1K+	$1.4800	reel of 500	[logo]¢U¢Z¢2¢T LM2575S -ADJ P+
LM2575-ADJ MDC	die		Full production	N/A	N/A				N/A	

Design Tools

Title	Size (in Kbytes)	Date	View Online	Download	Receive via Email
SimpleSwitcher® DC-DC Converters Design Software	14 Kbytes	1-Nov - 2000		View	

Fig. 5F

Application Notes

Title	Size (in Kbytes)	Date	View Online	Download	Receive via Email
AN-1061: AN-1061 Power Conversion in Line-Powered Equipment	142 Kbytes	5-Jan - 97	View Online	Download	Receive via Email
AN-776: Application Note 776 20 Watt Simple Switcher Forward Converter	387 Kbytes	1-May - 98	View Online	Download	Receive via Email

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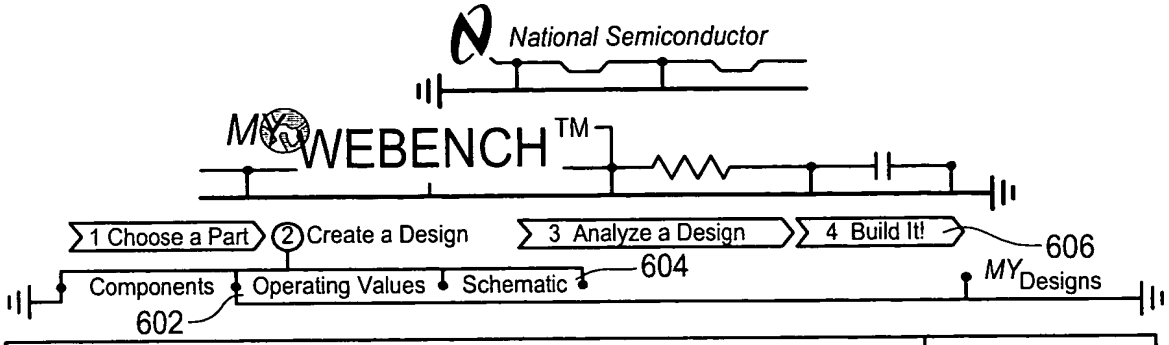
[Information as of 6-Nov-2000]

Fig. 5G



Design:	Design#6					Choose Operation
Device:	LM2672		Aug 30 2000 4:23PM		ID: 229899_6	Delete, Copy Rename, Add Notes Print, XML
Design	Requirements		Output	#1		
VinMin	=	14.00 V	Vout=	3.30	V	
VinMax	=	22.00 V	Iout=	1.00	A	

Components

Part	Manufacturer	Part#	Attributes	
Cb	AVX	08055C103KAT	0.010000 uF	Select Alternate Part
Cin	Nichicon	UPL1V121MPH	120.00 uF,0.1400 Ohms	Select Alternate Part
Cout	Vishay - Sprague	594D127X06R3C2T	120.00 uF,0.0850 Ohms	Select Alternate Part
Css	AVX	08055C103KAT	0.010000 uF	Select Alternate Part
D1	General Semiconductor	SS24	0.50 V	Select Alternate Part
IC	National Semiconductor	LM2672N-3.3	3.3,Buck	Select Alternate Part
L1	Coiltronics	UP2T -330	33.000 UH,0.0790 Ohms	Select Alternate Part

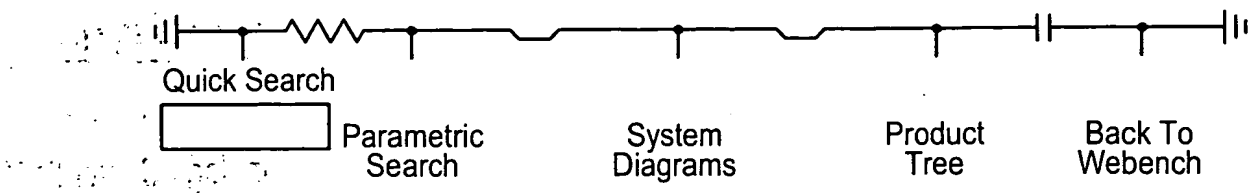
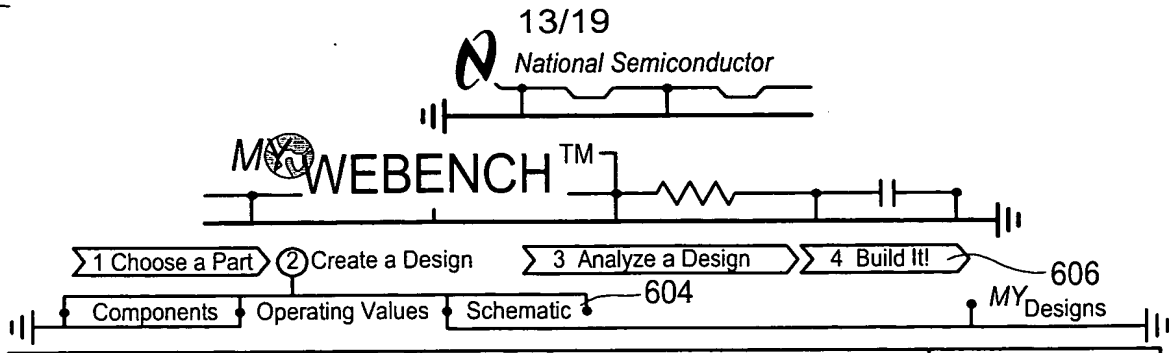


Fig. 6



Design:	Design#6				Choose Operation
Device:	LM2672	Aug 30 2000 4:23PM		ID: 229899_6	Delete, Copy Rename, Add Notes Print, XML
Design	Requirements	Output	#1		
VinMin	= 14.00 V	Vout=	3.30	V	
VinMax	= 22.00 V	Iout=	1.00	A	

Operating Values

#	Description	Parameter	Value
1	Continuous or Discontinuous Conduction mode, inductor current goes to zero in Discontinuous Conduction	Mode	Cont
2	Total Output Power	Pout	3.30 W
3	Pulse Width Modulation (PWM) frequency	Frequency	260.00 kHz

Operating Point at Vin= 22.00 V

#	Description	Parameter	Value
1	Bode Plot Phase Margin	Phase Marg	97.68 Deg
2	Bode Plot Crossover Frequency, indication of bandwidth of supply	Cross Freq	48.98 kHz
3	Peak-to-peak ripple voltage	Vout p-p	31.93 mV
4	IC Junction Temperature	IC Tj	95.40 øC
5	IC Junction to Ambient Thermal Resistance	ICThetaJA	100.21 øC/W
6	Steady State Efficiency	Efficiency	81.17 %
7	Steady State PWM Duty Cycle, range limits from 0 to 100	Duty Cycle	17.47 %

Current Analysis

#	Description	Parameter	Value
1	Average input current	Iin Avg	0.45 A
2	Peak Current in IC for Steady State Operating Point	IC Ipk	1.19 A
3	Input Capacitor RMS ripple current	Cin IRMS	0.20 A
4	Inductor ripple current, peak-to-peak value	L Ipp	0.38 A
5	Output Capacitor RMS ripple current	Cout IRMS	92.07 mA
6	ICs Maximum rated peak current	IC Ipk Max	1.30 A

Fig. 7A

Power Dissipation Analysis			
#	Description	Parameter	Value
1	Diode Power Dissipation	Diode Pd	0.41 W
2	Inductor Power Dissipation	L Pd	79.00 mW
3	IC Power Dissipation	IC Pd	0.25 W
4	Input Capacitor Power Dissipation	Cin Pd	20.47 mW

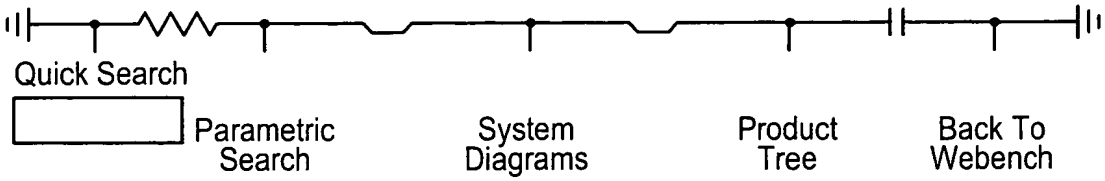


Fig. 7B

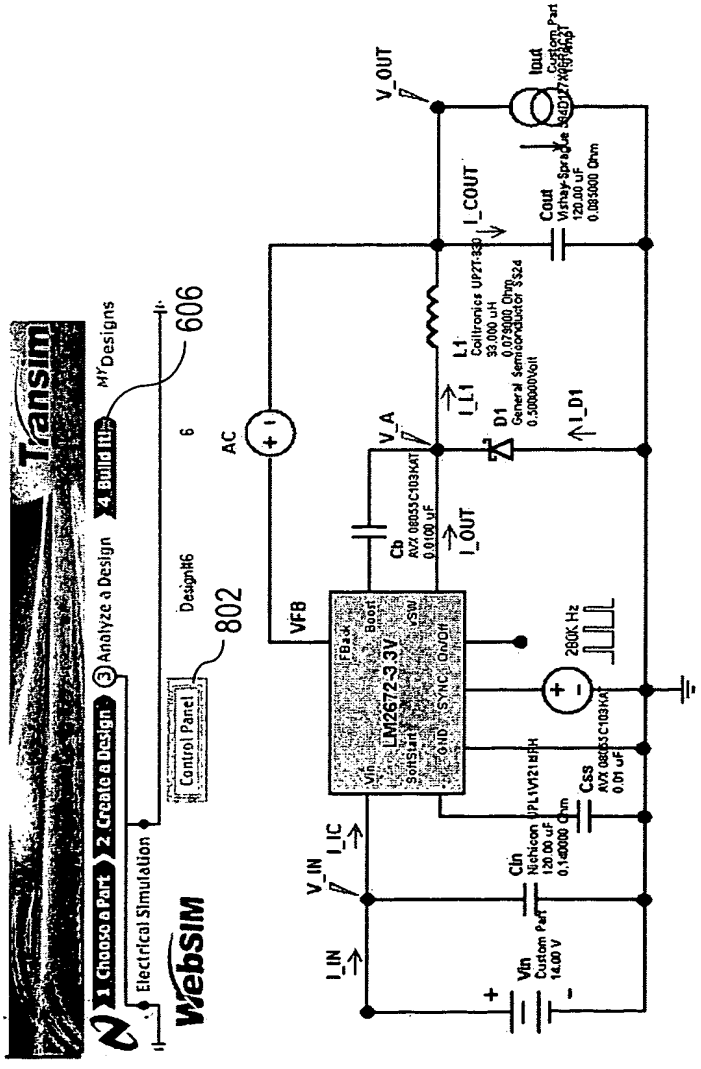


FIG. 8

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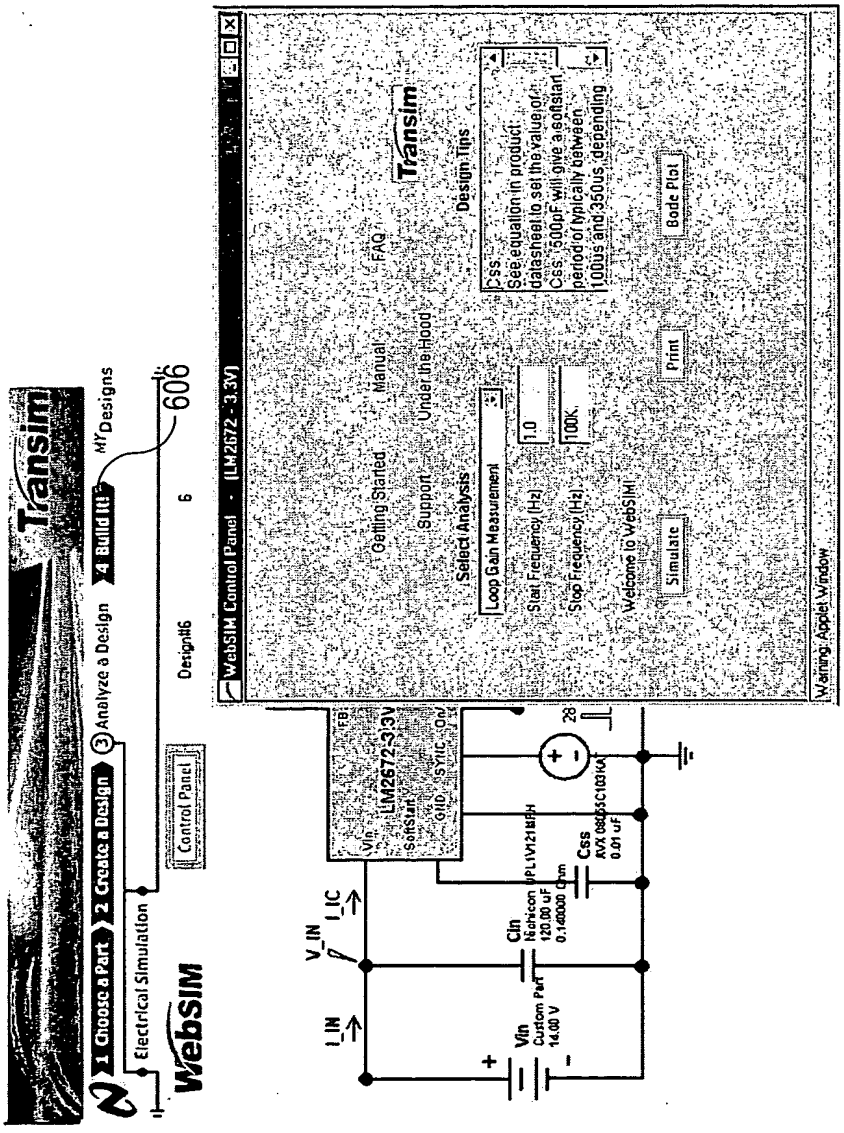

FIG. 9

National Semiconductor

MY WEBENCH™

1 Choose a Part | 2 Create a Design | 3 Analyze a Design | 4 Build It!

Buy Parts, Demo Boards, & Resources | MY Designs

Design ID: 6

Bill of Materials

Part	Manufacturer	Part#	Attributes	Price	Distributor	Order Parts
Cb	AVX	08055C103KAT	0.010000 uF	$ 0.02	Future - Active	-
D1	General Semiconductor	SS24	0.50 V	$ 0.20	Future - Active	-
IC	National Semiconductor	LM2672N-3.3	3.3,Buck,8-Lead DIP	$ 2.9000 (For Qty=100)	1004	Order Parts
L1	Coiltronics	UP2T-330	33.000 uH,0.0790 Ohms	Price Not Available		-
Cin	Nichicon	UPL1V121MPH	120.00 uF,0.1400 Ohms	$ .242	Avnet	-
Css	AVX	08055C103KAT	0.010000 uF	$ 0.02	Future - Active	-
Cout	Vishay - Sprague	594D127X06R3C2T	120.00 uF,0.0850 Ohms	$ 0.83	Future - Active	-
				Total Price: 4.212		ORDER KIT

1002

Quick Search

Parametric Search | Systems Diagrams | Product Tree | Back To Webench

Fig. 10

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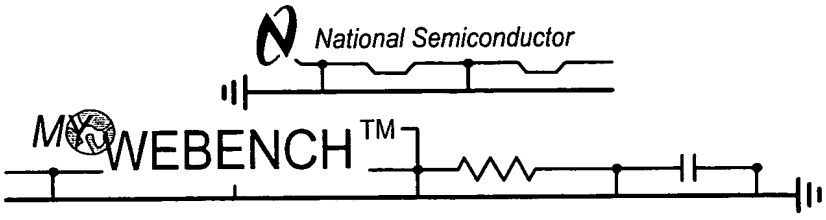

Brian Hickman- You have 6 designs stored in your personal workspace.

ID	DesignName	Device	CreationDate	ModificationDate	Design Assistant	Comments	Design Operations
6	Design#6	LM2672	Aug 30 2000 4:23PM		power		Modify , Analyze , Build , Delete , Add Notes .
5	Design#5	LM2670	Aug 30 2000 4:15PM		power		Modify , Analyze , Build , Delete , Add Notes .
4	Design#4	LM2672	Aug 30 2000 4:02PM		power		Modify , Analyze , Build , Delete , Add Notes .
3	Design#3	LM2575HV	Aug 30 2000 4:01PM		power		Modify , Analyze , Build , Delete , Add Notes .
2	Design#2	LM2575	Aug 30 2000 3:30PM		power		Modify , Analyze , Build , Delete , Add Notes .
1	Design#1		Aug 30 2000 3:29PM		power		Modify , Analyze , Build , Delete , Add Notes .

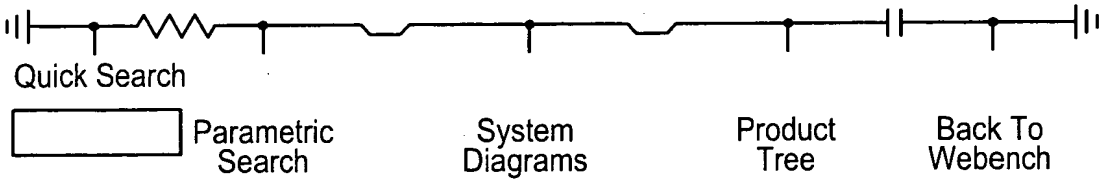

Fig. 11

19/19

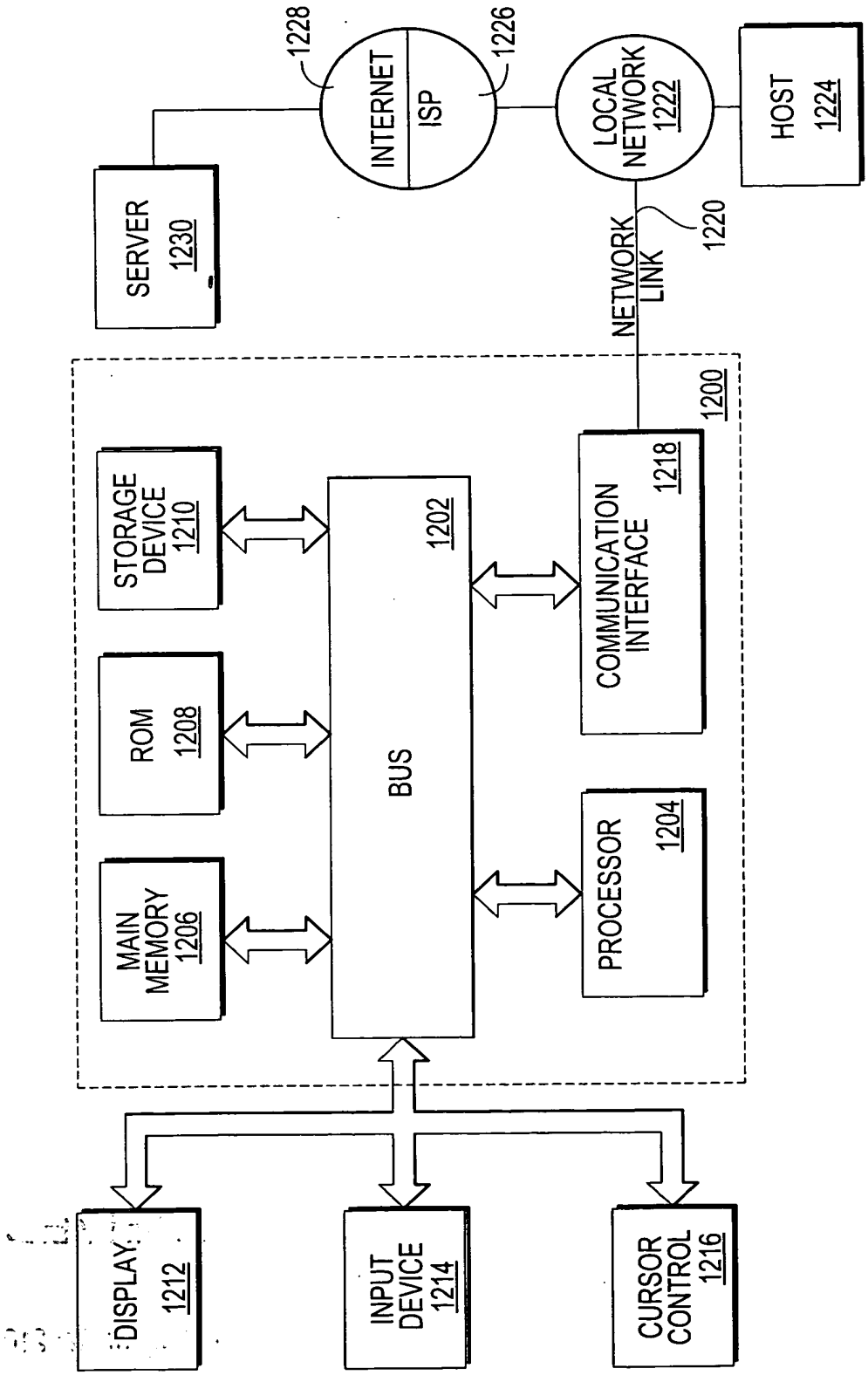

Fig. 12